

Report

**The Kyoto Protocol's Options for
Countries Not Included in Annex B—an
Analysis for Kazakhstan and Uzbekistan**

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The Kyoto Protocol's Options for Countries Not Included in Annex B—an Analysis for Kazakhstan and Uzbekistan

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Preface:

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1. Introduction

1.1. Background and purpose

When the Soviet Union broke up into a dozen independent republics in 1991, the Russian Federation and Ukraine inherited the USSR's signatory status on many international environmental agreements. The remaining republics—the Central Asian Republics, the Caucasus states, and the smaller republics to the west of Russia—were then left to decide individually whether to become signatories to these agreements, and under what terms. As a result, these new states have an opportunity to evaluate their roles within the international environmental legal regime and to consider how their own interests can best be served.

One of the agreements that many of the former Soviet Republics are now considering is the Kyoto Protocol to the Framework Convention on Climate Change (FCCC). The Kyoto Protocol, put forward in December 1997 during the third Conference of the Parties to the FCCC, lays out the general conditions for implementation of the FCCC and, in Annex B, sets binding greenhouse gas emissions limits for the set of wealthier nations included in Annex 1 of the FCCC, as a percentage each country's 1990 emissions baseline. It also specifies that for Annex B countries, international trading of emissions allowances and joint implementation by two or more countries will be permitted. Investment by Annex B countries in emissions reductions in non-Annex B countries is allowed on a project-by-project basis through the Clean Development Mechanism (CDM). Non-Annex B countries cannot participate fully in international emissions trading or joint implementation, however.

For those countries that are not part of Annex B—developing countries, countries with economies in transition, and other states of the former Soviet Union—but do wish to participate in international efforts to limit climate change, the Kyoto Protocol thus offers two options: sign on to Annex B, with its attendant obligation to limit GHG emissions and opportunity to participate in international emissions trading; or rely on the Clean Development mechanism and attempt to attract investment in individual, cost-effective emissions abatement projects.

The purpose of this paper is to examine the implications of each of these options for two former Soviet Republics in Central Asia, Kazakhstan and Uzbekistan, and make recommendations for analytical work that should be carried out during the coming year. The research for this paper was carried out as part of an ongoing environmental policy project sponsored by the U.S. Agency for International Development and implemented by the Harvard Institute for International Development (HIID). HIID has worked closely with policy makers in Kazakhstan and Uzbekistan on climate change issues for the past two years, and it provided substantial analytical assistance to the two governments as they prepared for the Fourth Conference of the Parties to the FCCC in Buenos Aires in November, 1998. As independent policy advisors, the role of HIID's local and international experts was to ensure that government officials were fully informed of their options under the Kyoto Protocol and assist in analyzing the likely costs and benefits.

The rest of this paper is organized as follows. The remainder of this section contains a brief description of the political and economic context in which Kazakhstan and Uzbekistan are

considering their options. The next section reviews the mechanics of the two main options identified above and compares them across key parameters. Section 3 looks at current and projected emissions profiles for Kazakhstan and Uzbekistan and analyzes which of the two options is likely to be more advantageous, and under what conditions. Finally, Section 4 offers a set of short- and medium-term recommendations for research and analysis that is needed to support the two countries' efforts to participate fully in the FCCC.

1.2. Political and economic context in the former Soviet Union

Although they are classed with the traditional developing countries as "non-Annex B countries," the former Soviet Republics face a somewhat different situation from most developing countries. They are, for the most part, heavily industrialized, and during the emissions baseline year (1990), they were very heavy emitters of greenhouse gases. The collapse of the Soviet Union and deterioration of regional economies, however, caused industrial production in the republics to plummet during the early 1990s, often to less than 50 percent of output a decade earlier. Production has not yet begun a serious recovery. As a result, most of the former Soviet Republics are emitting greenhouse gases at a level far below their 1990 baselines.¹ Moreover, because Soviet industrial processes were so inefficient, it is likely that future production, when it does recover, will be far less pollution-intensive than in Soviet times. Even when industrial production does reach its 1990 levels, it will thus generate a much lower level of greenhouse gas emissions than the 1990 baseline levels.

Because the former Soviet republics' current greenhouse gas emissions are generally far below their 1990 baselines, any republic that opts to sign on to Annex B of the Kyoto Protocol and accept a binding emissions limit is likely to have a large surplus of emissions allowances—beyond the country's own needs—for some number of years into the future. These surplus allowances have generated a great deal of international interest in the status under the Kyoto Protocol of the larger former Soviet republics, particularly Kazakhstan and Uzbekistan. The United States and other participants in the so-called "Umbrella Group" are supporting accession to Annex B, either in the near term or eventually, for Kazakhstan and Uzbekistan, while a number of EU and developing countries argue that, for various reasons, Kazakhstan and Uzbekistan should retain their "non-Annex B" status.

¹ Kazakhstan, for example, saw its total greenhouse gas emissions decrease from 266.134 million tons CO₂ equivalent in 1990 to 212.611 million tons CO₂ equivalent in 1994 (Government of Kazakhstan 1998).

2. The Emissions Trading and Credit Trading Framework in the Kyoto Protocol

Emissions trading offers two important benefits that affect both the overall prospects of the Protocol's ultimate success and the interests of each participating nation. Emissions trading allows nations to lower their compliance costs individually and thus to ensure that overall costs are reduced. At the same time, emissions trading can give countries the opportunity to engage in cooperative relationships that, in turn, can generate flows of revenue and technology to nations most in need of such support.

The Kyoto Protocol creates its legally binding emissions reduction commitments by allocating to each industrialized nation listed in Annex B an "assigned amount" of GHG emissions for the 2008-2012 period. The Protocol then builds an international GHG emissions trading system on this foundation of "assigned amounts." For nations that are deemed developing countries under the Kyoto Protocol, the ability to participate in emissions trading is limited, since such nations are not allocated "assigned amounts" under Annex B. At the same time, the negotiators of the Protocol recognized that those countries could offer highly cost-effective GHG emissions reduction opportunities for other nations with "assigned amount" obligations, while themselves enjoying the benefits of the transfer of revenue and technology that emissions trading entails. Accordingly, the Protocol authorizes the creation of a Clean Development Mechanism (CDM) through which countries without assigned amounts under Annex B can sell "certified" emissions reductions (or emissions credits) to Annex B countries. The following paragraphs discuss in more detail the articles of the Protocol pertaining to emissions trading and the CDM.

2.1 Emissions Trading Among Annex B Countries

Emissions trading as envisioned by the Kyoto Protocol is a broad mechanism for international cooperation involving the buying and selling of emissions allowances. An allowance is a specified share of a country's overall emissions quota, which is determined by the binding emissions limit that the country accepted under the Kyoto Protocol. Under a global emissions trading regime, allowances that are not needed to meet a country's own domestic compliance obligations will be tradable on the international market by national governments, private entities, or both. Participants in emissions trading can take a wide range of domestic measures to increase the number of allowances they have available to trade, including energy efficiency initiatives, fuel switching programs, sectoral adjustments, afforestation projects, and others. Individual investment projects in one of these areas—for example, a project to improve the efficiency of an electricity generator—will reduce the number of allowances needed to meet a country's domestic obligation, and thus free up more allowances for international trading (or, in the case of a net buyer of allowances, reduce the number that must be purchased overseas).

Three articles define the rules of emissions trading among countries that have accepted binding emissions limits under Annex B. Specifically (*italics added*):

- Article 17 specifies that the Conference of the Parties (COP) "shall define the relevant

principles, modalities, rules, and guidelines, in particular for verification, reporting, and accountability for *emissions trading*."

- Similarly, Article 6 authorizes *trading of project-based emissions reductions* "additional to any that would otherwise occur," and specifies that the COP "serving as the meeting of the Parties to this Protocol may ... elaborate guidelines ... including for verification and reporting." Article 6 specifically provides for the trading among Annex B countries of "emission reduction units" from individual projects, and it permits parties to authorize "legal entities" to participate in trading activities.
- Finally, Article 3 stipulates that emissions reductions traded under both Article 6 and Article 17 must be *added to*, or *subtracted from*, the trading countries' "assigned amounts," thereby establishing the most important rule or element of the trading system. Article 3 renders trading under Article 6 and Article 17 virtually indistinguishable for purposes of accounting for parties' trading activities, and it fully establishes a unified mechanism for ensuring that all traded emissions reductions are "surplus" and can substitute for other emissions reductions.

These articles are sufficient to create the structure for emissions trading between and among Annex B parties. It seems clear that the Protocol contemplates that individual parties determine as a matter of their own discretion whether to restrict trading to governments themselves or to permit non-governmental entities to trade emissions reductions created by individual projects.

2.2 The Clean Development Mechanism

The Clean Development Mechanism is essentially a variation on the approach to emissions abatement known as joint implementation (JI). Joint implementation, a concept contained in the FCCC and implemented on a pilot basis from 1992 to 1995, allows two countries with different costs of emissions abatement to fulfill their obligations to reduce GHG emissions jointly. Under joint implementation, a donor country government or enterprise invests in a discrete emissions reduction or carbon sequestration project in a recipient country that offers low-cost abatement or sequestration opportunities. The project generates an emissions *credit* (or offset)—a verified reduction in emissions achieved through a specific JI project—which the donor can then use to offset its own emissions. The recipient country, in turn, secures the benefits of the investment and technology transfer required for the project.

Article 12 of the Kyoto Protocol defines a clean development mechanism to permit Annex B countries to invest in and receive credit for emissions reduction and carbon sequestration projects in non-Annex B countries, while simultaneously permitting developing and transitional countries to participate in the FCCC and secure investment and technology transfer. Annex B countries will receive credit only for "certified" emissions reductions that are *in addition to* any reductions in GHG emissions or increase in carbon sequestration that would have occurred without the project. Independent auditing and verification of project activities will be required to confirm that the conditions for granting emissions credits are met. CDM participants can include public and private entities.

It is important to note that in the language of the FCCC and the Kyoto Protocol, joint implementation now refers only to projects undertaken within Annex B countries, while the CDM applies to projects in all non-Annex B countries. Because non-Annex B countries do not have binding emissions limits, they do not have emissions allowances, as Annex B countries do, but only the possibility of generating emissions credits.

2.3. The Differences Between the CDM and Emissions Trading

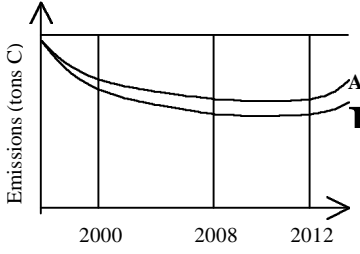
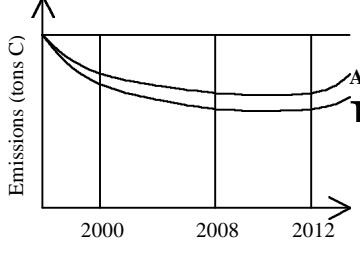
As described above, the Clean Development Mechanism, to which non-Annex B countries will have access, will involve investments in discrete emissions reduction projects, along the lines of joint implementation, while emissions trading—in which Annex B countries are likely to engage—will entail trading of shares of a country's emissions quota. The generic differences between emissions trading and emissions credit projects are outlined in Table 1, while Table 2 compares more directly the CDM and emissions trading among Annex B countries.

Table 1: Principal differences between emissions trading and emissions credit projects

Item	Allowance trading	Emissions credits (or offsets)
Commodity	Allowances (permits)	Credits (offsets)
Property right	Use of atmosphere (budget)	Only credits
Compliance	Based on emission inventories	Based on project monitoring
Institutions	International market	Ad hoc trades approved by governments
Reference	National cap	Project baseline
Emission monitoring	National inventories	Project emissions
Incentive for seller/host	Revenues to national budget (environmental fund)	Revenues to project
Implementation of reductions	Policy instruments	Direct technology investment
Transaction costs	Low	Possibly high
National implementation cost	Possibly high	Low
Reduction potential	Large	Limited
Development	International market construction as a whole	Gradual evolution of market

Source: "A National Strategy for Joint Implementation in the Czech Republic." October 1997. Pp. 19-20.

Table 2: Comparison of the CDM and emissions trading

Parameter	Clean Development Mechanism	Emissions trading
Timing of full scale implementation	After the first COP following Protocol ratification	As forward sales after Protocol ratification
Quantity of (abated) emissions eligible for trading ^(a)	 <p>A: projected emissions with domestic reduction measures B: projected emissions with domestic and international reduction measures</p>	 <p>A: projected emissions with domestic reduction measures B: projected emissions with domestic and international reduction measures</p>
Risk	Ratification will be delayed	The budget will be exceeded
Risk management	Small probability of reducing risk through negotiation process	Good possibility of reducing risk through macroeconomic forecasting and domestic policy measures
Trade volume	Only additional and supplementary projects	Any GHG emissions reduction projects
Problems with implementation	High transaction costs, difficulty in defining the base line	Requires highly qualified personnel to develop forecasting methods
Implementation costs and coverage of management costs	No less than 10-15% of project costs	Approximately 5-10% of trade revenues
Employment	Some additional employment, but no substantial increase	Increases due to greater number of projects, including no regret options

Note (a): This row assumes that it will be possible to receive CDM credits for incremental emissions reductions beginning in the year 2000, while trading of allowances will not begin until 2008. Neither of these assumptions is final yet.

2.4. Analysis of the Two Options

In principle, the Clean Development Mechanism is intended to provide the same benefits as emissions trading, allowing developing countries and countries in transition to participate in the international GHG emissions trading market as fully as Annex B countries and thereby secure many of the same benefits of emissions trading. In practice, however, the CDM might prove difficult to utilize, and the benefits somewhat diminished. Tables 1 and 2 make clear that emissions trading offers substantial advantages over use of the CDM in terms of lower transactions costs and ease of implementation. By accepting a binding emissions limit and participating in full trading, a country can avoid the substantial transaction costs associated with certifying the emissions reductions from each individual project and can open its entire domestic markets to broad-based investment in cleaner development paths. Because of this, it is possible that a country not currently included in Annex B would gain more, at least in terms of participating in the global GHG emissions trading market, by joining Annex B and sidestepping the CDM.

The main reason for skepticism about the benefits of the CDM is that the structure of the Protocol and the "mechanics" of the trading it creates for Annex B countries make it much easier for Annex B countries to trade with each other than to use the CDM to generate emissions credits in non-Annex B countries, for three reasons:

- The provisions establishing emissions trading for Annex B nations are almost self-executing, requiring little additional action by subsequent Conferences of the Parties.
- Under Annex B trading sovereign nations—that is, the trading partners—have broad discretion in determining the elements of trading with each other.
- Although GHG reductions beginning in the year 2000 may be traded, trading under the CDM cannot take place until the future meetings of the Parties to the Protocol establish the rules for the CDM. Such rules will inevitably create additional costs and uncertainties, as they must address a number of difficult issues which must be resolved to ensure the validity of trading with countries without assigned amounts—a set of problems and costs completely absent from Annex B trading.

Although emissions trading is more attractive than the CDM, trading is possible only for countries that are prepared to accept quantitative limits on their GHG emissions. A country can do this only if it has an accepted, reliable estimate of baseline emissions and has the capacity to make reliable long-term projections of future emissions. These projections require, in turn, good macroeconomic models of GDP growth and energy intensity. If the country is at a stage at which its development path is not yet clearly determined and many different GHG emissions scenarios are possible, then Annex B is not likely to be a wise choice. A country in this situation will probably be better served by the CDM.

3. Analysis for Kazakhstan and Uzbekistan

For the reasons discussed in detail in Section 2, developing and transitional countries that hope to participate fully in global greenhouse gas emissions markets are likely to attract more investment capital as parties to Annex 1 of the FCCC/Annex B of the Kyoto Protocol than they will as participants in the Clean Development Mechanism, *provided that they can negotiate binding emissions limits that do not slow their economic development*. This section identifies what information on economic growth and energy use will be needed for Kazakhstan and Uzbekistan to determine whether they should accept a binding emissions limit, and at what level.

For Kazakhstan or Uzbekistan (or any other country) to assess its likely revenues under either Annex B trading or the CDM, it needs information on five basic indicators:

- (1) price per ton of CO₂ (equivalent)
- (2) projected emissions (based on GDP growth estimates) and potential volume of trade
- (3) revenue flows from emissions reductions investments
- (4) availability of additional capital
- (5) transactions costs.

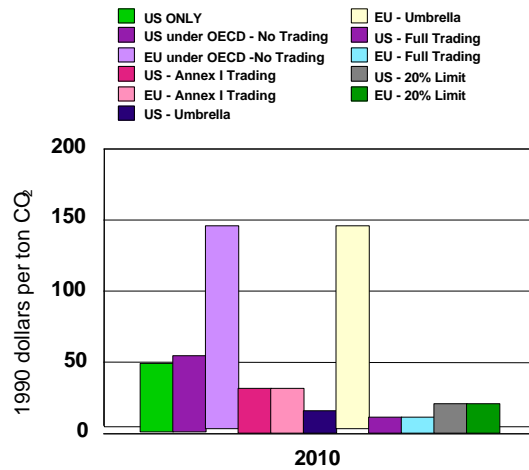
Below we will review what information is currently available on each of these indicators, in detail for Kazakhstan and somewhat more briefly for Uzbekistan. In the next section we will discuss in more depth what information is still needed, and how it might be generated.

3.1. Analysis for Kazakhstan

(1) price per ton of CO₂

A number of researchers have generated estimates of the likely market price of emissions allowances under various trading scenarios. Figure 1 presents one such estimate for 2010, midway through the first trading period.

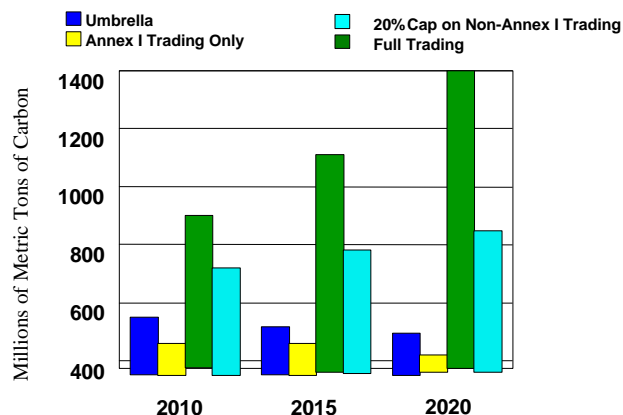
Figure 1: Projected greenhouse gas reduction prices under various trading scenarios



Source: G-Cubed—Collaborative Research Between the Brookings Institution and the U.S. EPA

Although Kazakhstan and Uzbekistan are relatively large emitters of greenhouse gases, and have the potential to be important suppliers of GHG allowances in an international market, it is clear that Russia and Ukraine will be the dominant suppliers under any Annex B trading scenario. Figure 2 indicates the total volume of trading expected under different scenarios.

Figure 2: Projected volume of trade under various trading scenarios



Source: G-Cubed—Collaborative Research Between the Brookings Institution and the U.S. EPA

To place Kazakhstan’s potential supply of tradable allowances in context, it is useful to note that Kazakhstan’s *total* GHG emissions in 1994 were estimated at 58 million tons of carbon (Government of Kazakhstan 1998).² We shall therefore consider the Central Asian countries to be price takers, no matter what decisions they make about market participation.

According to Figure 1, the lowest price for a ton of CO₂ is likely to be approximately \$10. The price seems unlikely to rise above about \$50 per ton, except under the most restrictive (non-trading) scenarios. To minimize our chances of over-estimating the potential benefits to Kazakhstan and Uzbekistan of participation in Annex B, we will assume the price of CO₂ on international markets in the year 2010 to be \$10/ton, a figure which is consistent with the results of several other market models as well. The selling price of a one-ton credit generated through a CDM project will be the same as (or lower than) this, and it must cover both project costs and transaction costs.

(2) projected emissions and potential volume of trade

The quantity of allowances that Kazakhstan will have available to trade in various periods, should it join Annex B, depends on assumptions about GDP growth, energy use, and investment in emissions reductions projects, as well as on the level of the country’s commitment under Annex B. A number of forecasts are available that estimate the volume of trade possible under different reduction commitments. Table 3 summarizes these.

² A ratio of 3.667 tons of CO₂ to 1 ton of carbon was used to calculate this figure.

Table 3: Preliminary assessments of Kazakhstan's emissions surpluses or deficits

Starting date for transactions and forecasting scenario	Emissions reduction target as a percentage of 1990 baseline (million tons)		
	100%	85%	80%
2000			
• EE forecast	31.0	2.4	-7.2
• PT forecast	8.6	-20.5	-30.2
• MP forecast	41.1	10.3	0.0
• PS forecast	46.0	15.2	4.9
2005			
• PT forecast	-2.2	-31.3	-41.0
• MP forecast	10.5	-20.3	-30.6
• PS forecast	16.2	-14.6	-24.9
2010			
• PT forecast	-8.4	-37.5	-47.2
• MP forecast	-29.1	-59.9	-70.2
• PS forecast	-14.2	-45.0	-55.3

Forecasts:

EE—expert estimates (source uncertain)

PT—fuel consumption estimates made by the Institute of Economic Research, Kazakhstan

MP—energy planning model estimates (source uncertain)

PS—estimates made for the National Strategy of Kazakhstan, including some emissions reductions measures.

Source: National Strategy of Kazakhstan, 1997.

By 2010, it is likely that Annex B nations will be able to buy and sell emissions allowances. All of the forecasts in Table 3 show Kazakhstan as a net *buyer* of allowances in 2010 even if its target is 100 percent of its 1990 baselines. If these forecasts were reliable—and we doubt they are—then Kazakhstan would want to propose an Annex B target in the neighborhood of 105-120 percent of its 1990 baseline. As we will discuss in the next section, however, developing better macroeconomic models to project future emissions is at the top of the agenda if Kazakhstan is to select a feasible and sustainable target.

One conclusion we can draw is that Kazakhstan will have far fewer tons of carbon to sell under the CDM than under Annex B. Under the CDM, credits are generated only by individual projects and only for additional emissions reductions, beyond what would have been achieved without the

project. Countries relying on the CDM cannot trade surplus emissions rights that are a consequence of structural changes in the macroeconomy or general policy changes, such as the creation of incentives to conserve energy.

(3) revenue flows from emissions reductions investments

If we assume that credits from CDM projects can be accumulated starting in 2000 (which is quite unlikely) and that, on a project-by-project basis, it will be possible to sell 10 percent of the potential supply of emissions reductions, then the total revenue (not profit) from CDM projects might be in the neighborhood of 46 million \$U.S. during the first budget period (2008-2012). Under an emissions trading system, if early trades start in 2005 (which is quite possible), then revenue is likely to reach 150 million \$U.S. even if Kazakhstan accepts a relatively restrictive emissions limit.

Part of the reason for this difference in revenues is that an emissions trading program allows a country to trade the credits generated by any GHG emissions reduction activity, including “no-regrets” projects that would be beneficial even without carbon benefits. CDM projects, in contrast, require additionally (i.e. credits generated must result from emissions reductions that are in addition to any that might have taken place without the CDM project). As a result, many projects that reduce GHG emissions will not qualify for the CDM.

(4) availability of additional capital

As it was mentioned above, many GHG reduction projects will have financial and economic returns in addition to their carbon benefits (such as energy efficiency projects that reduce production costs in addition to generating emissions credits). These projects will be attractive not only for investors searching for carbon credits, but for “traditional” investors as well. For each dollar of carbon investment it receives, Kazakhstan can anticipate perhaps two dollars of traditional investment (the World Bank’s estimate for Russia is 1:4). Since some projects will require both traditional and carbon investment to make them viable, the volume of projects (and thus of emissions allowances available to trade) will depend to some extent on the availability of “traditional” investment capital.

(5) transactions costs

As described above, the CDM will require a project-by-project approach and a multi-step approval process. Implementation of CDM projects could take several years and require significant administrative efforts. As a result, total implementation costs for CDM projects could exceed twenty percent of total project costs, though with relatively modest start-up costs for Kazakhstan. Under an emissions trading system, in contrast, start-up costs to launch the system within Kazakhstan will be relatively high, but transaction costs should not exceed 5-10 percent of carbon allowance prices. Over time, the lower transaction costs associated with Annex B trading should significantly increase Kazakhstan’s net revenues.

3.2. Analysis for Uzbekistan

(1) price per ton of CO₂

Uzbekistan, like Kazakhstan, is likely to be a price taker in the international market for GHG emissions allowances. We will therefore assume that \$10/ton CO₂ is a reasonable estimate of the price Uzbekistan can expect to receive for credits or allowances.

(2) projected emissions and potential volume of trade

Uzbekistan has a developing economy. It is one of the few former Soviet republics to have constant (positive) population growth: its population in 2010 could exceed 28 million, compared to 20.4 million in 1990. Uzbekistan's analysts have developed three scenarios for future GDP growth, and the differences among them are significant, as Table 4 indicates.

Table 4: Projected GDP growth in Uzbekistan, 1998-2010

Scenario	GDP in billion sum					Average annual growth
	1998	1999	2000	2005	2010	
Inertia scenario	54.79	56	57	62.96	69.2	2.2%
Possible scenario	55.76	57.09	60.3	72.38	86.85	4.0%
Optimistic scenario	56.46	59.45	62.6	79.2	100.18	5.2%
Population	23,940,000	24,322,000	24,704,100	26,384,500	28,197,100	1.3-1.6%

Source: Draft National Strategy Study (World Bank)

Depending on which of these scenarios is most accurate, Uzbekistan's GDP in 2010 might be anywhere from 26 percent to 77 percent greater than its GDP in 1998. Other estimates suggest that the country's GHG emissions in 2010 could be anywhere from 120 percent to 140 percent of its 1990 baseline. That range is too great for the country to take on a quantitative obligation at this time—a realistic GHG emissions limit, as a percentage of its 1990 level, would be quite difficult to set. More accurate macroeconomic analysis is needed, ideally using a simulation model adjusted for an economy in transition. It is quite possible that further macroeconomic analysis will lead to more accurate projections of future GHG emissions. Until better projections are available, however, Uzbekistan will be better served by participating in the CDM, rather than attempting to accede to Annex B. In light of this conclusion, it is less urgent to analyze how Uzbekistan would fare under an emissions trading regime than to consider how to move forward with macroeconomic modeling and with the identification and preparation of projects for CDM financing.

4. Conclusions and Recommendations

The preceding discussion illustrates several points that are critical to countries not currently in Annex B, but which understand the benefits of participating in an international GHG emissions trading system. For those countries, the main benefit of such activity lies in the opportunity to increase the transfer of revenue, investment, and technology from highly industrialized countries. The Kyoto Protocol offers current non-Annex B countries two alternatives. Under one, they can choose to join Annex B and meet "assigned amount" obligations. Any country that does so can participate fully in a system of emissions trading whose operational requirements are almost fully established in the Protocol itself and, for the most part, will not be subject to subsequent negotiations among the parties to the FCCC or the Kyoto Protocol.

Current non-Annex B countries that choose to pursue the other alternative—of trading through the CDM—risk delaying substantially, and probably diminishing, the opportunity to trade with highly industrialized countries. CDM trading can only take place after the CDM itself is established, a process that might take several years of negotiation. Even after the CDM is put into operation, countries or companies seeking to trade will likely be subject to rules and administrative requirements that will make transactions under the CDM more costly than those under Annex B. As a result, countries in Annex B will not only be able to engage in GHG emissions trading sooner, but will offer a cost advantage over those countries that must conduct trading under the CDM.

That said, it is also clear that some countries that in principle would like to join Annex B are simply not yet ready for the obligations it imposes. They either do not have the macroeconomic modeling capacity to identify a realistic "assigned amount," or they do not have the institutional and technical capacity to implement and manage an allowance trading system at the national level (or both). For these countries, early accession to Annex B would be a mistake, and attention should focus on maximizing the benefits offered by the CDM instead.

4.1. Recommendations for Kazakhstan

For Kazakhstan and Uzbekistan, it seems reasonable to assume that in the long-term, both countries will accept binding emissions limits and become full participants in international emissions trading. The decision facing them is what to do in the short- and medium-term (roughly 2000-2008 and 2008-2012, respectively). This decision hinges on two issues: 1) a comparison of the potential revenues from early trades under Annex B with those from realization of CDM projects; and 2) the potential costs to the country of accepting a binding emissions limit.

Kazakhstan appears nearly ready to take on a binding emissions limit and establish the institutions needed to participate in Annex B. The country's main efforts, therefore, should focus on acceding to Annex B. We recommend that priority be given to three activities.

1. Developing a communications and negotiating strategy
 - i) Internally, the immediate challenge for Kazakhstan is to develop a policy paper laying out

the country's climate change negotiating position, with particular focus on emissions forecasts and their relationship to the proposed Annex B commitment.

- ii) Externally, it is important to bear in mind that Annex B accession (as well as emissions trading itself) remains controversial among those negotiating implementation of the Kyoto Protocol. In order to ensure the positive response that Kazakhstan's position deserves, an effective communications strategy must be developed. It needs to emphasize the elements listed below, with a particular emphasis on the budget commitment (the closer to 1990 levels, the more credible) and on the domestic measures for implementation. In the latter regard, focusing attention on mechanisms that would harness and manage investments for additional GHG reductions (such as the National Environmental Protection Fund) should be highlighted.

The elements of an effective communication package for Kazakhstan, to be used at COP-4 in Buenos Aires and beyond, might include:

- statement of intention to accede to Annex 1
 - emissions target
 - national mechanism for GHG monitoring and control
 - emissions trading strategy pitched to investors to include potential project portfolio
 - national strategy for reinvestment of funds to create sustainable flow of reductions over time
 - creation of registry
 - expected environmental benefits including collateral reductions in conventional pollutants.
- iii) Finally, Kazakhstan needs to begin investigating the legal issues involved in acceding to Annex B and developing an Annex B accession strategy for itself and others, based upon the best present legal understanding of the FCCC and the Kyoto Protocol. Under the Kyoto Protocol, any developing nation can sign up for a GHG emissions limit that accommodates that nation's legitimate development needs, provided that a three-quarters majority of the other parties to the Protocol assent to the proposed commitment level.

The timing of accession to Annex B is important, as it will determine the extent to which a country can participate in early trading. Kazakhstan's interest in taking advantage of its relatively low current level of emissions argues in favor of moving forward with accession quickly. The text of the FCCC and the Kyoto Protocol does not spell out clearly how accession to Annex 1 and Annex B should be handled, however. A lawyer with expertise in international environmental agreements will be needed to assist Kazakhstan in this effort.

Current procedures for acceding to Annex B are far from perfect. For that reason, we recommend that the countries considering joining Annex B form a coalition to pursue their interests. The coalition could initiate the establishment of a clear and transparent procedure for joining Annex B. It is likely that several former Soviet republics would

support formation of such a group, along with some developing countries.

2. Building capacity to perform macroeconomic analysis

A critical requirement for Kazakhstan before it can propose a realistic emissions limit under Annex B is to generate a more accurate forecast of GHG emissions for the first budget period (2008-2012). A sound analysis of GNP growth, energy intensity, and the effect of domestic incentives for emissions reductions is needed for use in designing and evaluating national policy and programs and in formulating a supply curve of emissions reductions for Kazakhstan.

A country's ministry of economy is typically in charge of forecasting GDP growth. The World Bank and other organizations have also developed forecasts. Additional screening of existing macroeconomic models is needed to choose the most appropriate one for Kazakhstan. Two or more models could be used together if needed. Some—and perhaps much—of the information needed for these models will not be available, however. It might be necessary to develop a simplified model to compensate for the lack of data. For this reason, the selection, adaptation, and adjustment of a model could take up to two years.

The appendix to this paper provides further discussion of macroeconomic modeling issues.

3. Developing a national GHG control strategy

Effective implementation of Kazakhstan's Annex B emissions trading strategy requires the development of a detailed legislative or regulatory plan for GHG control. A variety of different approaches are possible including phasing of programs. However, the foundation elements are a high quality GHG inventory, accurate monitoring, and effective emissions control. The national strategy can be informed and developed according to the estimated market conditions evaluated in the macroeconomic portion of the study. This strategy should have firm legal roots no matter which emissions trading pathway is selected. An evaluation of the adequacy of existing authorities and institutions would be a necessary first step. Proposals for strengthening capacity should follow.

4.2. Recommendations for Uzbekistan

Unlike Kazakhstan, Uzbekistan still faces a considerable task before it will be ready to accede to Annex B. We recommend that Uzbekistan consider accession to Annex B as a long-term strategic goal, and to regard emissions trading as an instrument that Uzbekistan can use when it is ready to take on a realistic quantitative obligation for GHG emissions reduction. This recommendation suggests several steps in the near and medium term.

- i) First, development of GHG emissions forecasting models is a high priority, as in Kazakhstan.
- ii) Second, Uzbekistan should support the efforts of the Umbrella Group to create an inclusive, democratic system for international emissions trading. This will help ensure that

Uzbekistan can indeed benefit from emissions trading once it is ready to accede to Annex B.

- iii) Third, the CDM should be utilized as fully as possible until Annex B accession is feasible. Establishment of a CDM project pipeline might increase the number of projects implemented under the CDM and, in the long term, might promote the development of an effective mechanism for GHG emissions management.
- iv) Finally, the results of Uzbekistan's 1990 GHG emissions inventory should be re-examined. It is likely that consumption of fossil fuel by villages, small heating facilities, and citizens with private residences was overlooked in this inventory.

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Appendix: Market Development and Macroeconomic Modeling

Market developments are viewed from the perspective of several discrete stages. The first may be from 1999-2004 as the earliest phase of the market. In this period called the Early Transactions Stage (ETS), it is assumed that the primary market participants will be those parties with Annex B obligations and among those chiefly the umbrella group. It further assumes that the CDM, if available, will subject to both uncertainty in terms of final crediting and relatively high transactions costs. The ETS is likely to be characterized by relatively low demand due to inherent uncertainties (including whether Kyoto will ever enter into force) and reasonably available supply through the umbrella group.

The second stage of market development might be thought of as occurring roughly between 2004-2008. This the Preparing for Kyoto Stage (PKS). At this juncture, the CDM might be available, or at least uncertainties concerning crediting may be reduced. At the same time, if the CDM is available, some of the uncertainty surrounding whether the Kyoto Protocol would enter into force may recede. As a result, PKS is likely to be characterized by less uncertainty on the demand side as buyers have more assurance about the value of their potential purchases and somewhat increased supply.

The third stage of market development would be the first budget period itself from 2008-2012. In the stage we would expect Full Implementation of the Kyoto Protocol (FIKP). During FIKP, the major uncertainties would arise from constraints established on emissions trading as a compliance tool in the form of quantitative limitations imposed either multilaterally or unilaterally. On the supply side, the major uncertainty will be the ability to use carbon sequestration fully. Absent serious quantitative constraints, this stage should see full market development but without the low-end values associated with carbon sequestration.

The final stage of the market is the post-2012 period in which a subsequent budget would take effect. For this final stage of the proposed analysis, Annex B limits would likely be tightened and the number of nations joining Annex B would be increased. The CDM is likely to be constrained or perhaps no longer available. Demand would likely increase but also be more elastic while supply would also increase but be more inelastic.

Once these market stages are qualitatively and quantitatively characterized, the price scenarios developed can be used with staged characterizations of Kazakhstan's supply curve for reductions to determine potential revenues and policies. Of particular importance is the understanding of the mix of strategies between forward sales, project-based investing (traditional joint implementation), and options or contingent sales. The optimal mix will critically depend upon the reduction investment opportunities available within the country over time. This approach would also support the development of a long-term national strategy for sustainable reductions through national policies and programs.